Matrix Approach for Technology Management in Telecommunications Industry

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Abstract

Global competitive environment in telecommunications requires that current R&D management process should be changed. Recently strategic alliance of technology is frequently selected to cope with such environment by major telecommunication companies. The first step for strategic alliance of technology is to identify the technologies that are most needed by the firms. This paper argues that quality function deployment(QFD) matrix that has been successfully used for drawing technologies from customer needs can be applied to management of telecommunication technologies. It describes the management process by successive matrix handling. The steps to draw technology priority are detailed. Nominal measures, such as current company rating, competitor's rating, planned level, improvement ratio, that are used for prioritizing customer needs in QFD matrix, cannot be directly applied to telecommunications. Instead, several new measures are devised to prioritize telecommunication services and to develop competitive benchmarks.

Keywords: QFD, Telecommunications, Technology Management

1. Introduction

Until recently, telecommunications service providers have stayed largely within their own national borders, because most countries own their own telecommunications service providers. These providers generate healthy revenues for their governments. Prices for key services like switched-voice, long-distance are typically kept artificially high to ensure high revenue. However, since 1980s, deregulation, privatization, and competition are the new concepts dotting the global telecommunications landscape. The first seed of change sprouted in 1984 when AT&T was deregulated in the United States and was followed by several countries including the United Kingdom. As a result, government-owned telecommunication companies in the process of privatization have generally been suffered from declination of profits.

While Korea Telecom was holding monopoly of both supplying and operating telecommunications services in Korea, its revenue was always guaranteed by the government. During those rosy years, the priority of R&D topics in telecommunications technology area had been determined from the viewpoint of the enhancement of national technology level, though most fund was drawn from Korea Telecom (KT). Because of deregulation Korea Telecom faced competitors inside the country as well as outside the country. In additions, telecommunications operators cannot survive with technological inland because of short development cycle and high risk of large investment. To cope with such environment, telecommunications operators began working together in the area of R&D. This requires that the current R&D management process be changed in which in-house R&D topics are proposed and some of them are selected. Strategic alliance of technology is frequently selected to cope with global competitive environment by major telecommunications companies. The first step for strategic alliance of technology is to identity the technologies that are most needed by the firms.

Several researchers have studied on the area of R&D management. Methodologies for solving R&D project selection problem can be categorized into three groups: scoring models; linear, non-linear, integer and goal programming; and multi-attribute utility theory [5]. Although the models have become more complex, there are several limitations for their use [6]. Once all the equations are given, PR/MS techniques offers optimal solutions. In reality, the limitations on availability of inputs were major constraints on the use of such quantified methodologies [10]. Thus, scoring models are preferred in terms of ease of use low cost [9]. Using questionnaires data, Lee et al. [4] set priority by scoring each telecommunications technologies. Analytic hierarchy process(AHP) has competitive edge over other well-known scoring models since the criteria weights or priorities established by the AHP are based on use a ratio scale by human judgments instead of arbitrary scales [5].

Although the AHP is frequently used for prioritizing telecommunications technologies [3,4,11], there is little room for reflecting the customer needs, competitor's status. The principles found in total quality management have long advocated focusing on the customer as the key to better selling and, ultimately increased profit [2]. Recent telecommunications trend characterized by liberalization and globalization are driving the companies not attaining world-scale advantages to the unrecoverable pitfalls. This paper modifies QFD matrix to draw telecommunications technology priority from customer needs and competitor's capability.

2. QFD Background

QFD was first systematized in Japan in the mid-1970s at Mitsubishi's Kobe shipyards [1]. QFD refers to the functions responsible for quality in a company's areas of design, manufacturing, service, and so forth. In 1980s, QFD was introduced to the United States and has used by a wide range of companies including 3M, Eastman Kodak, AT&T, Bell Labs, Digital Equipment Company, Ford Motor Company, and Proctor and Gamble [2]. QFD is often cited as the key to getting high performance where it counts by focusing an organization on the customer's needs and prioritizing those needs to produce competitive products or services [2]. QFD matrix is used for analyzing customer needs vs. technical requirements. The parameters of the matrix involve measuring, comparing, and contrasting two sets of elements. Typical QFD matrix is shown in Fig. 1.

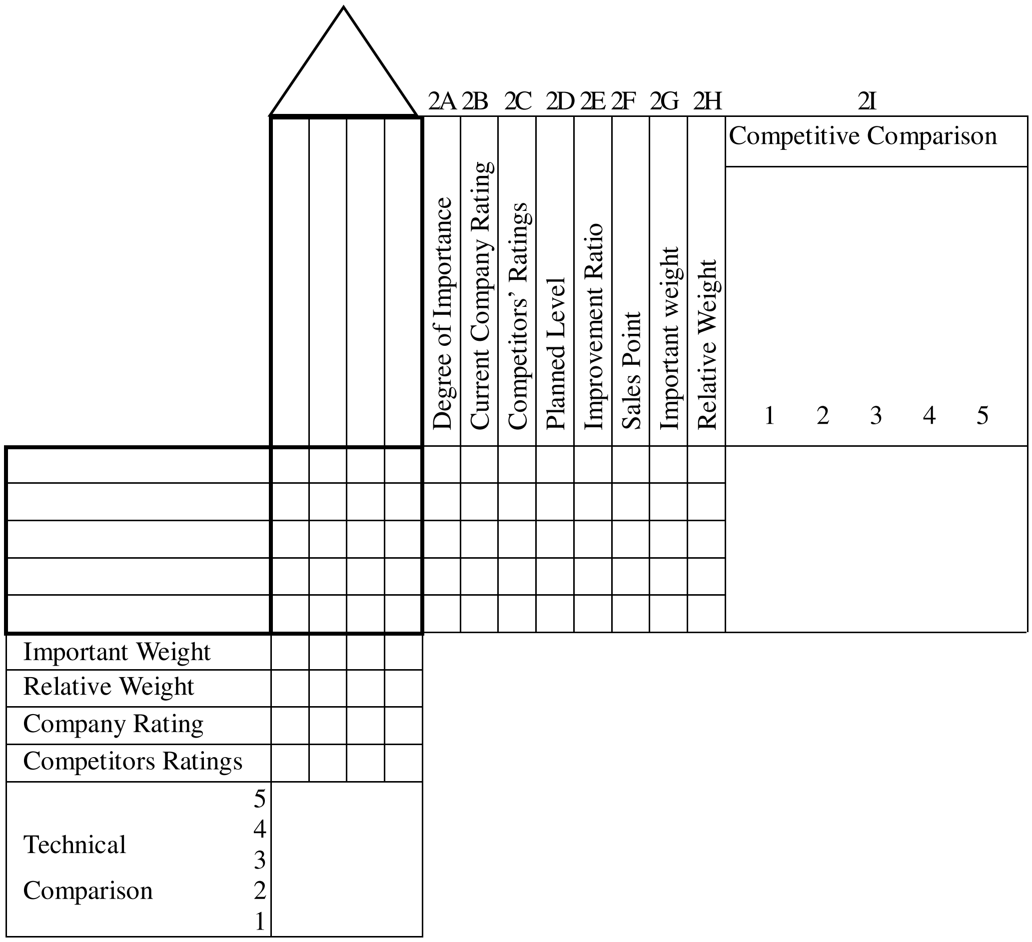

Fig. 1. Typical GFD Matrix

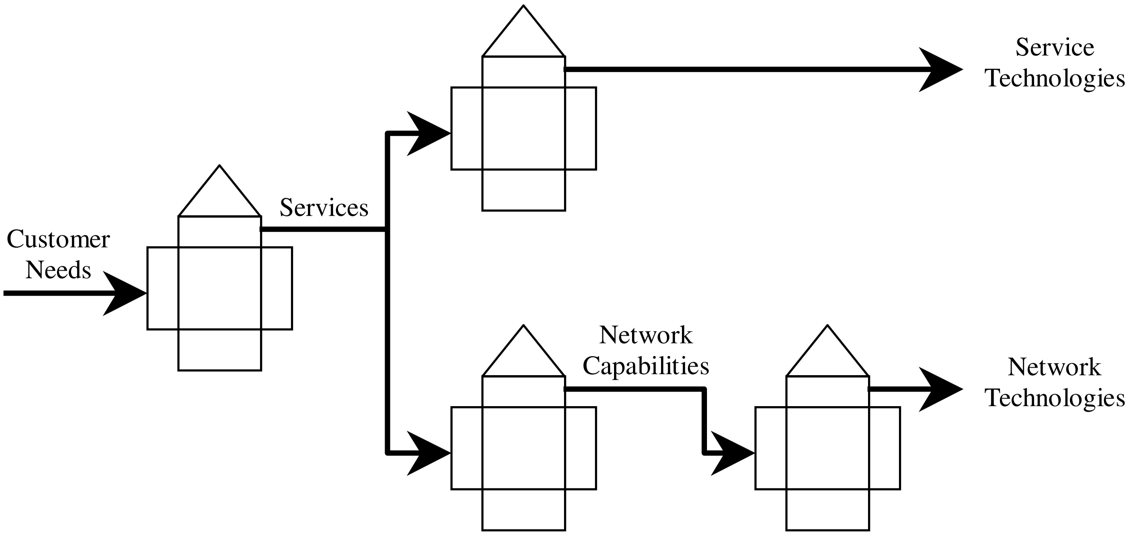

Fig. 2. Steps to Draw Technology Priority

3. Methodology

From customer's point of view, his/her telecommunication needs are satisfied by services which telecommunication operator provides. From the viewpoint of telecommunication operators, services which customer wants can be provided only if they are done through telecommunication network. Telecommunication technologies can be classified into two groups: service technologies; and network technologies. The relationships between services and network technologies are hardly identified. In this paper, they are drawn their relationships to network capabilities. Fig. 2 represents these processes by successive matrix handling. The steps to draw technology priority are as follows:

1) identify customer needs.
2) identify future services.
3) fill out customer needs-future services matrix.
4) identify service technologies for providing services.
5) fill out future services-service technologies matrix.
6) identify network capabilities for providing network.
7) fill out future service-network capabilities.
8) identify network technologies.
9) fill out network capabilities-network technologies matrix.

Several limitations have been identified for direct applications of QFD matrix to telecommunications technology selection problem. The problem of prioritizing telecommunication technologies is different from the other applications in that most services, products, or technologies are in conceptual stages. Thus, direct comparisons among competing companies are impossible.

In this paper, company's rating, column 2B in Fig. 1, is substituted by the expected deployment plan of the company. In a similar way, the competitor's rating, column 2C in Fig. 1, can be substituted by the expected deployment plan of the competitor. In reality, the information for the expected deployment plan of the competitor cannot be easily obtained because of its confidentiality. In this paper, the earliest year that experts have prospected for commercial service is used as a substitute of the competitor's rating since it summarizes each competitor's position. Planned level, column 2D in Fig. 1, was nor relevant to the current problem because plan was already used in 2B. Improvement ratio, column 2D in Fig. 1, is used to calculate importance weight in typical QFD matrix. AS 2B and 2C were changed, improvement ratio cannot be used. In this paper, time-to-market ratio is devised since shipping electronics products late to the market dramatically affects profits [8]. Time-to-market ratio is calculated by dividing the expected deployment plan of the company by the earliest year that expert have prospected for commercial service (2B divided by 2C). The other columns are the same as the corresponding columns of typical QFD matrix. Fig.3 shows the proposed matrix for telecommunication technology selection.

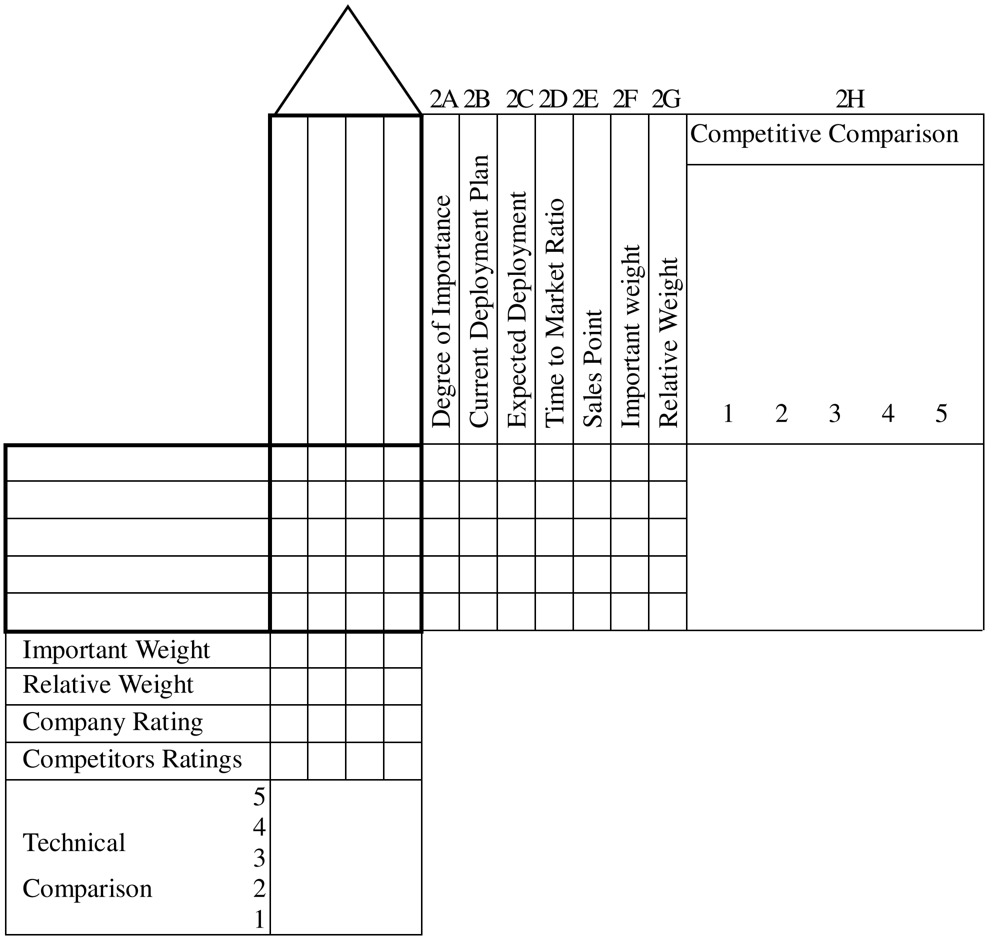

Fig. 3. Proposed Matrix for Telecommunication Technology Selection

4. Conclusion

This paper argues that QFD matrix can be applied to selection of telecommunication technologies. It shows that technology priority can be drawn from customer needs through successive matrix handling. Nominal measures, such as current company rating, that are used for prioritizing custormer needs in QFD matrix, cannot be directly applied to telecommunications. Instead, several new measures are devised to prioritize telecommunication services and to develop competitive benchmarks. They includes current service deployment plan, expected earliest deployment, time to market ratio. For unbiased output, the leveling of classification should be required.

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